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GB 2232183 A GB 2207943 A GB 1210909 A
EP 0659939 A1 US 4624210 A

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(54) Abstract Title
Traffic safety product

(57) A traffic safety product (preferably a road cone) comprises a main body portion on which is located a retro-reflective material (14). To protect the reflective material from damage when the product is stacked, a stacking protector is provided. This protector may be in the form of a ridge (18) or ridges (18) and (19), the lip defined by a recess (16, Figure 4) or discontinuous projections (21 and 22, Figure 8).

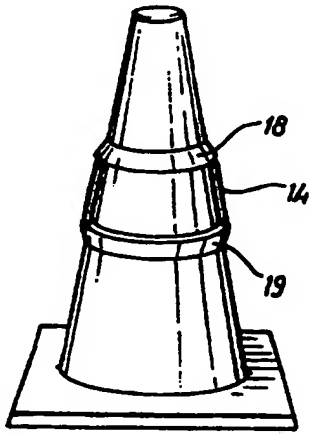

FIG. 7

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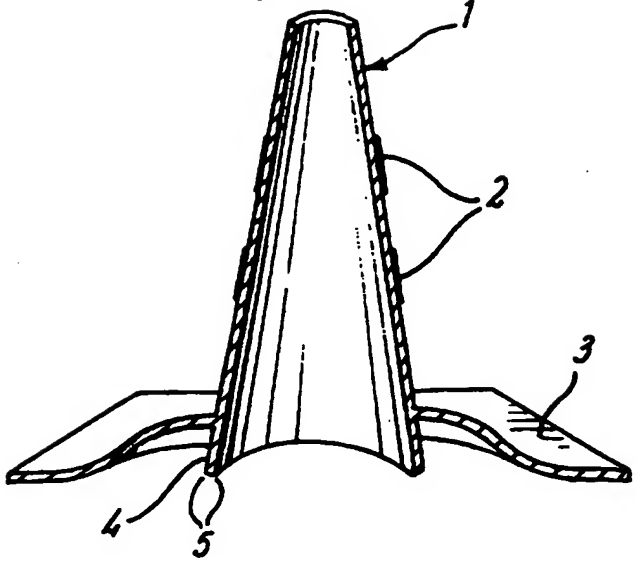


FIG. 1
(Prior Art)

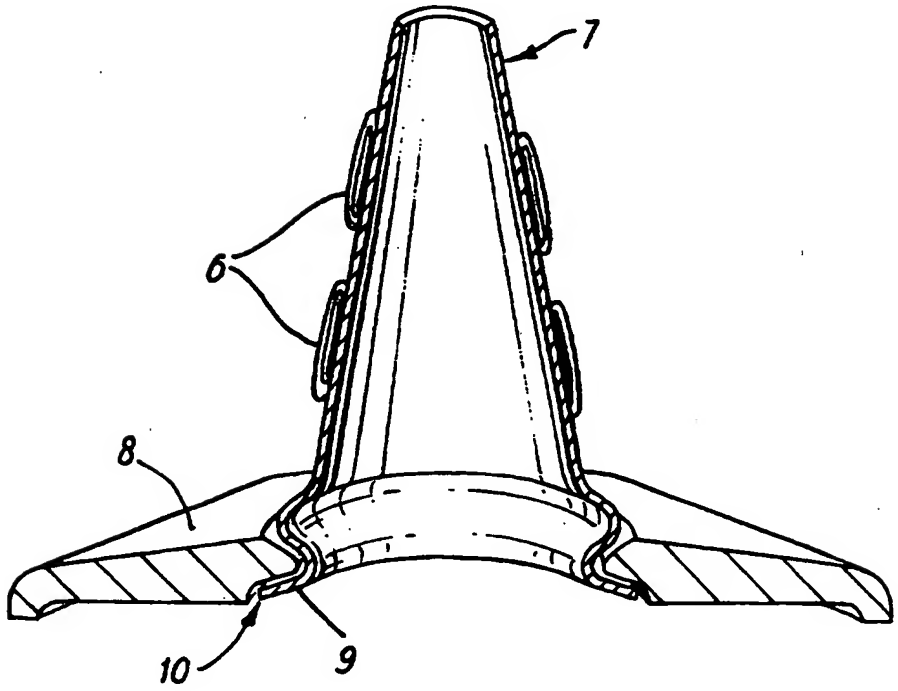
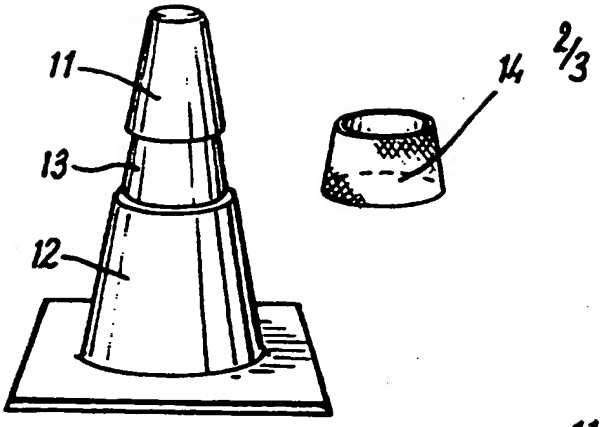
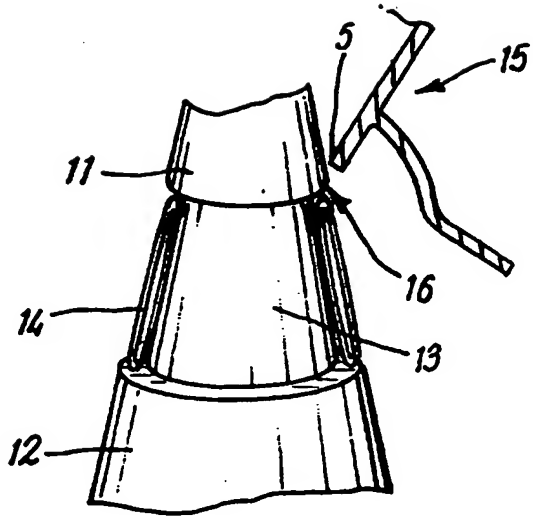


FIG. 2
(Prior Art)



ФИГ. 3



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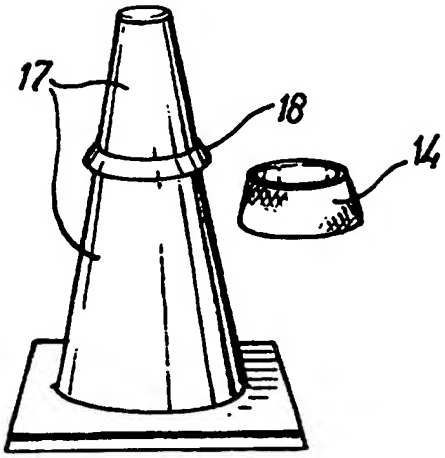

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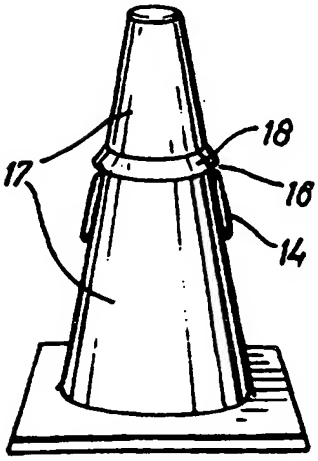

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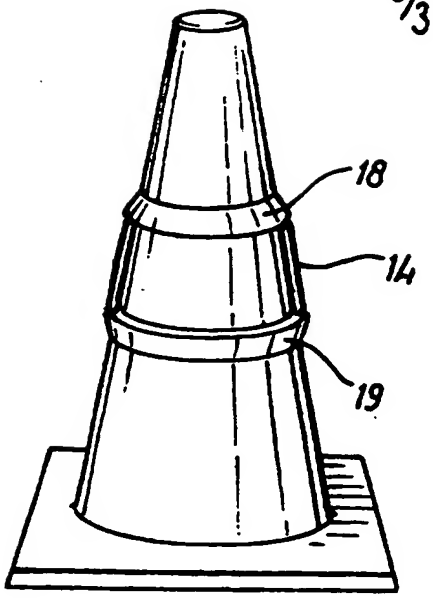

FIG. 7

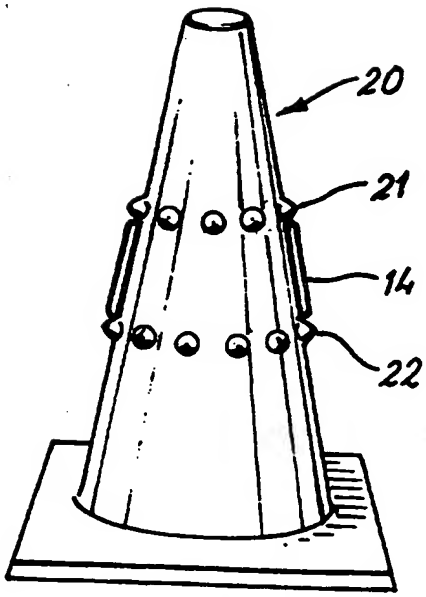

FIG. 8

TRAFFIC SAFETY PRODUCT

This invention relates to a traffic safety product and more particularly, but not exclusively, to a conical shaped road traffic cone of the type used at temporary road works.

Traffic cones are well known. It has long been the practice to apply retro-reflective materials to their surfaces to make them visible at night. The characteristics of traffic cones and the retro-reflective materials used on the cones has traditionally varied from country to country, particularly within Europe.

In some countries within mainland Europe, it has been conventional to use injection moulded plastics cones which typically have applied to them a very thin layer retro-reflective sheeting of the open bead type such as that manufactured by the 3M Corporation of the USA and marketed under their registered trade mark "Scotchlite" as product number 8850. This material is typically less than 150 microns thick and is attached to the cone's surface by a very aggressive and continuous layer of adhesive contained within the sheeting's substrate or binder layer, extending right up to the edge of the retro-reflective area. This material is pre-cut to a strip shape before application to the cone, but due to its thinness and aggressive adhesion, skill and care is necessary to ensure correct alignment. This is time consuming and costly as a consequence.

A typical injection moulded cone of the type conventionally used in mainland Europe is illustrated in fig.1. This cone comprises a visible conical portion, two bands of very thin fully adhered retro-reflective material 2, a horizontal base plate portion 3,

and a downwardly projecting skirt portion 4 with sharp lower corner parts 5. The downwardly projecting skirt extension 4 to the visible conical part 1 is provided at the region below which the horizontal base support platform 3 meets the conical portion 1. This downwardly projecting skirt 4 assists in supporting the conical portion 1 and resists downward compression. Almost all such cones with this feature have sharp corners to the lowermost part of the downwardly projecting skirt 4.

As with all cones, it is beneficial to store them when not in use, nested or stacked one upon the other. A workman familiar with this task quickly develops skill sufficient to release his/her hand grip from a cone to be stacked on another at a distance such that it might be projected in an arc so that the open skirt portion is caught by the narrow top of the "stack" cone. This action can cause the sharp corners of the skirt of the injection moulded type of cone to scrape down the side of the "stack" cone and the retro-reflective material on the cone's surface. Historically, this caused only very minor damage to the retro-reflective material on the cones of the type in fig.1, because the retro-reflective material employed on this type of cone is very well adhered to the cone and is exceedingly thin. In practice, the sharp corners glided easily over the retro-reflective material employed, and the surface grazing experienced has been accepted in the market.

In other countries outside mainland Europe, notably the U.K., it has been traditional to use cones of a different method of manufacture. Typically, these have been of two part construction, employing a blow moulded or rotational moulded plastics conical section designed such that they have a feature towards the lower part

of the cone which receives a base portion that has a matching circular hole in its centre to receive the conical part.

Also, it has been traditional to employ retro-reflective material of different construction to the type 8850 previously described. In the U.K. retro-reflective portions have traditionally been of the air incident envelope or pocket type materials which usually have a relatively thick PVC substrate and an additional equally thick top protective cover over the glass microsphere layer, giving an overall material thickness of as much as 450 or even 750 microns. They also typically incorporate a welded edge seal between the upper cover layer and substrate which presents, in many cases, a raised edge, standing proud of the conical body surface. In addition, it has been traditional in the U.K. not to adhere the retro-reflective area in totality to the cone body, because traditionally, they are preformed into conical bands or sleeves before fitting. Point adhesion or localised discontinuous adhesion has proven adequate. Even where adhesive is used over the "full" area of the retro-reflective portion, the edges are rarely fully adhered in the true sense. The ability to employ preformed sleeves of this type saves the manufacturer much time in fitting or applying the retro-reflective surfaces to the cone when compared to the material used in cones of the type illustrated in fig.1. The saving in time gained is commercially significant.

Unlike the injection moulded cones, however, the traditional U.K. blow moulded or rotationally moulded cones do not have sharp cornered skirt extensions protruding downwards below the base, but instead, present very smoothly rounded lower forms around the inside opening of the lower part of the cone, these forms

serving to retain the base part to the conical part.

To better explain this, reference is now made to fig.2 which is a vertical cross section of a typical U.K. cone of the blow moulded or rotational moulded two piece cone type. In fig.2 are shown:- a visible conical portion 7, U.K. type construction relatively thick retro-reflective portions 6, a base plate 8 which has a circular opening in its centre to receive the smoothly shaped forms 9 on the conical part which engage and hold the base and cone together. It will be apparent that the termination points of the conical part 10 are pointing away from the opening in the cone, almost in a horizontal plane. Any sharp edges or corners that they might have are, therefore, well away from any possible contact with another cone when stacking occurs.

Thus, cones of this type when stacked as described before, present an opening which has a smooth flowing rounded form to the "stack" cone, such that they generally ride easily over even the thickest of the retro-reflective materials employed without damaging them. This has, for many years, allowed the less expensive but quite satisfactory preformed sleeves to be employed on road cones of this type.

In recent years trade between the U.K. and mainland Europe in road safety furniture has increased. Particularly since 1993 there has been an increasing uptake in mainland European nations of the U.K. type two piece cones described above. They have been well received by users. However, after initial rapid acceptance of these cones outside the U.K., it was discovered that the retro-reflective portion of U.K. type construction were not providing the same service life expectation experienced over

many years of use in the U.K., but sometimes exhibited premature failure by damage, particularly to the upper edges of the retro-reflective band(s). For some time, no ready explanation was forthcoming until it was discovered that damage was reported most frequently when cones of the injection moulded type were used/stacked repeatedly amongst the cones of the U.K. type. The explanation for this unexpected very serious problem was found to be due to the sharp corners of the skirt on the injection moulded cones as shown in fig.1 snatching the edges of the thicker retro-reflective material employed on the fig. 2 conventional U.K. cone. This unexpected and hitherto unexperienced problem threatened the reputation of the conventional U.K. cones in mainland Europe and is affecting commercial prospects for manufactures of such cones.

The present invention has been made from a consideration of this problem.

According to the present invention there is provided a traffic safety product comprising a main body portion having thereon a region of retro-reflective material, wherein stacking protection means is provided above the said region of the retro-reflective material, said protection means extending from the main body portion so as to protect at least an upper edge of the said retro-reflective material during stacking of another traffic safety product on the said traffic safety product.

Preferably, the stacking protection means is integrally secured to the main body portion. Alternatively, the stacking protection means is separable from the main body portion.

The stacking protection means may comprise a projection which extends from the main body. The stacking projection means may comprise a continuous projection such as a ring or a plurality of projections making up a discontinuous ring.

A second stacking protection means may be provided below the retro-reflective material.

The stacking protection means may be provided by an upper lip of a recess in which the retro-reflective material is located.

The depth of the stacking protection means is preferably at least 50% of the thickness of the retro-reflective material and is ideally at least equal to the thickness of the retro-reflective material.

The traffic safety product is preferably a road cone.

In order that the present invention may be more readily understood specific embodiments thereof will now be described by way of example only with reference to the accompany drawings in which:-

Fig.1 is a vertical cross section through the centre of a typical prior art injection moulded traffic cone;

Fig.2 is a vertical cross section of a typical prior art blow moulded or rotational

moulded two piece road cone;

Fig.3 shows a first traffic cone in accordance with the present invention;

Fig.4 depicts a portion of the traffic cone of fig.3 in the process of being stacked with another dissimilar road cone;

Fig.5 shows a second traffic cone in accordance with the present invention prior to the fitting of a retro-reflective sleeve;

Fig.6 shows the traffic cone of fig.5 having a retro-reflective sleeve fitted thereto;

Fig.7 depicts a further traffic cone in accordance with the present invention; and

Fig.8 depicts a still further traffic cone in accordance with the present invention.

Figs.1 and 2 have already been disclosed in detail in the introductory part hereof and consequently no further description thereof is considered necessary here.

Referring now to fig.3, the upper part of the conical body 11 and the lower part 12 of a cone have surfaces that if no interruption existed between them, would be

continuous. In other words, they are in line with each other. Thus it can be seen that a recess 13 is provided in the cone between the upper 11 and lower 12 parts thereof. This recess receives a sleeve of retro-reflective material 14. The depth of the recess 13 may be equal to or deeper than the thickness of sleeve 14 but is not necessarily so. Experiments show that a recess 13 of depth even as little as 30% the thickness of the sleeve 14 employed can reduce stacking damage, although the effect of a recess 13 of depth equal to or greater than 50% of the thickness of the material 14 is more predictable and is to be preferred. The vertical length of the recess 13 is preferably equal to or greater than the vertical length of material 14. However, it is preferable that if the length of the recess 13 is markedly greater than the length of the sleeve 14, then the sleeve 14 should be applied or manufactured to fit the recess so that the upper edge of the sleeve 14 is snug fitting to the overhang of portion 11 of the cone body. It is further preferable that the retro-reflective material 14 employed should have a degree of elasticity so that if preformed into a frustro conical shape, it will stretchover the lower rim of upper cone body portion 11 and snap or creep back to a close fit to recess 13. The recess 13 should preferably be parallel in form to cone portions 11 and 12 but does not need to be, to be effective. It may well be satisfactory for the depth of the recess to be shallower at the lower end than the top end or vice-versa. If preformed as a sleeve or band, retro-reflective portion 14 if also resilient and of the correct size, may be usefully retained in recess 13 to a satisfactory degree without the use of adhesive, a hitherto unobtainable advantage since it reduces cost of applying adhesive and also considerably eases the task of applying the retro-reflective material to the cone.

Referring now to fig.4, which shows an enlarged view of a portion of the cone of fig.3, together with a portion of the lowest part of a traditional injection moulded cone 15 with the sleeve of retro-reflective material 14 in place in recess 13, it will be seen that sleeve 14 has its upper edge 16 protected by the overhang of upper cone body portion 11. If the injection moulded cone 15 and particularly the sharp corners of its skirt 5 scrapes downwards when being stacked, it will pass over the upper edge 16 without damage.

Referring now to fig.5, there is provided a cone with continuous sides 17 having moulded onto it a ring 18 that projects from the cone body as its lower extremity and blends into the cone body sides 17 at its upper extremity. The retro-reflective material, in this case a preformed band snaps over ring 18 to fit snugly below it as is shown in fig.6, thus protecting the upper edge 16.

Fig.7 shows a similar cone to that depicted in figs. 5 and 6, but with two protruding rings 18 and 19 protecting the sleeve 14.

Fig.8 shows a cone 20 with retro-reflective material 14 protected by discontinuous rings 21 and 22 in this case in the form of hemispherical protrusions.

It will be understood that more than one band of retro-reflective material may be employed in more than one protected area as described. It is frequent practice to employ 2 or 3 such bands. In this case, each retro-reflective portion can be protected individually.

Bands of retro-reflective material of all types obtain some benefit of life expectancy extension from the use of this invention, but the invention is especially beneficial for use with materials or sheetings of more than 150 microns in thickness and for preformed frustro conical sleeves. In stacking tests, an injection moulded cone of the type described earlier with reference to fig.1 was repeatedly and forcefully thrown onto, firstly cones of the roto moulded/blow moulded two part cone of the type described with reference to fig.2 and then onto cones of the type described with reference to fig.7 with protected but identical retro-reflective preformed sleeve material of 520 microns thickness. The cones of fig.2 suffered damage to the upper edge of the retro-reflective material after as few as ten "stacks" but on average, some damage was always evident after twenty five "stacks". The cones of fig.7 showed no visible damage to the upper edge of the retro-reflective material on any sample at five hundred "stacks", the only damage observed being some very mild general lower surface scuffing. It is believed that actual life usage in real conditions will confirm that life expectancy of the preformed sleeve retro-reflective material will be at least 10 times greater for a cone of the type illustrated in fig.7 than for a cone of the type shown in fig.2 when used and stacked in combination with cones of the type illustrated in fig.1.

The use of cones in accordance with this invention also provides cost savings where adhesive is eliminated. Future field trials are expected to confirm preliminary tests that indicate that a perfectly serviceable cone of at least the type shown in fig.7 and probably all the other types of figs. 3 to 8 can be achieved without the use of adhesive, especially if a preformed partially elastic (or at least stretchable by 3%)

sleeve of frustro conical shape is employed.

In the tests conducted to date, it has become apparent that whilst all of the preferred arrangements shown in figs. 3 to 8 are serviceable, those illustrated in figs. 7 and 8 provide a better overall effect in protection of the retro-reflective material than the embodiment of figs.3 and 4.

The embodiment of figs.3 and 4, whilst protecting the otherwise exposed upper edge still permits the sharp corners 5 of cones to fig.1 to continue their scraping action down the surface of the retro-reflective material, in some circumstances this can still cause a degree of scuffing (although much reduced in severity) to the outer protective cover of thick retro-reflective materials. The embodiments employing projections such as those of figs. 5,6,7 and 8 however, if correctly designed, actually deflect the sharp corners 5 of cones to fig.1 at a shallow angle away from the surface of the retro-reflective material. This almost entirely eliminates surface damage whilst stacking cones of fig.1 on top of cones of figs. 5,6,7 and 8.

It may prove that a combination of protrusions such as those of figs. 5,6,7 and 8 and the recess of figs.3 and 4 is even more effective.

The market for road cones is extremely competitive throughout the whole of Europe and even minor manufacturing cost differences will determine which manufacturer will be more successful. The use of the thick film preformed retro-reflective sleeves provides such a cost advantage. However, this advantage is brought

to nought if the user becomes dissatisfied with the product's service life. This invention provides a way not only to achieve the required service life in all use situations employing combinations of cones of different types of manufacture, but increases the competitive advantage further where sport adhesive or overall surface adhesion can be discarded.

Even without the use of preformed sleeves advantage in reducing scuffing of any retro-reflective material whether thin or thick is gained. Thus this invention encompasses retro-reflective films or materials of any thickness and type whether preformed or applied as a flat film piece. It will be understood that it is advantageous to integrally mould into the cone body any of the features exampled in or equivalent to those in figs.3 to 8, but if so desired, they may be achieved by the addition of extra separate parts such as rings or collars of appropriate shape, which may then be fixed in some way to the cone to achieve the same effect.

It is to be understood that the above described embodiments are by way of illustration only. Many modifications and variations are possible. In particular this invention is not restricted to any specific manufacturing technique employed to make road cones but may be used equally well in all manufacturing methods by those practised in that art.

CLAIMS

1. A traffic safety product comprising a main body portion having thereon a region of retro-reflective material, wherein stacking protection means is provided above the said region of the retro-reflective material, said protection means extending from the main body portion so as to protect at least an upper edge of the said retro-reflective material during stacking of another traffic safety product on the said traffic safety product.

2. A traffic safety product as claimed in claim 1, wherein the stacking protection means is integrally secured to the main body portion.

3. A traffic safety product as claimed in claim 1, wherein the stacking protection means is separable from the main body portion.

4. A traffic safety product as claimed in any preceding claim, wherein the stacking protection means comprises a projection extending from the main body.

5. A traffic safety product as claimed in any preceding claim, wherein the stacking protection means comprises a plurality of projections.

6. A traffic safety product as claimed in any preceding claim, wherein a second stacking protection means is provided below the retro-reflective material.

7. A traffic safety product as claimed in claim 1, wherein the stacking protection

means is provided by an upper lip of a recess in which the retro-reflective material is located.

8. A traffic safety product as claimed in any preceding claim, wherein the depth of the stacking protection means is at least 50% of the thickness of the retro-reflective material.

9. A traffic safety product as claimed in any preceding claim, wherein the depth of the stacking protection means is at least equal to the thickness of the retro-reflective material.

10. A traffic safety products as claimed in any preceding claim, wherein the traffic safety product is a traffic cone.

11. A traffic safety product substantially as defined herein with reference to any of figs.3 and 4, 5 and 6, 7 or 8.

The Patent Office

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Application No: GB 9717055.9 **Examiner:** Matthew Males
Claims searched: 1-11 **Date of search:** 29 October 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E1G (GLJ)

Int Cl (Ed.6): E01F 9/011, 9/012, 9/014, 9/015

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
X	GB 2,232,183 A	Melba Products Limited (page 5, lines 6-7; Figure 1).	1, 3, 4 and 7-10
X	GB 2,207,943 A	Patrick Joseph Feerick (page 2, lines 1-7; page 5, lines 11-14; Figure 1).	1, 2 & 7-10
X	GB 1,210,909	Lindvale Plastics Limited (Page 1, lines 21-33 and 49-55; Figure 2).	1, 2, 4 & 8-10
X	EP 0,659,939 A1	Swintex Limited (Figure 11).	1, 2, 4 & 6-10
X	US 4,624,210	Geoffrey M. Glass (column 3, lines 31-41; Figure 1).	7-9

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.